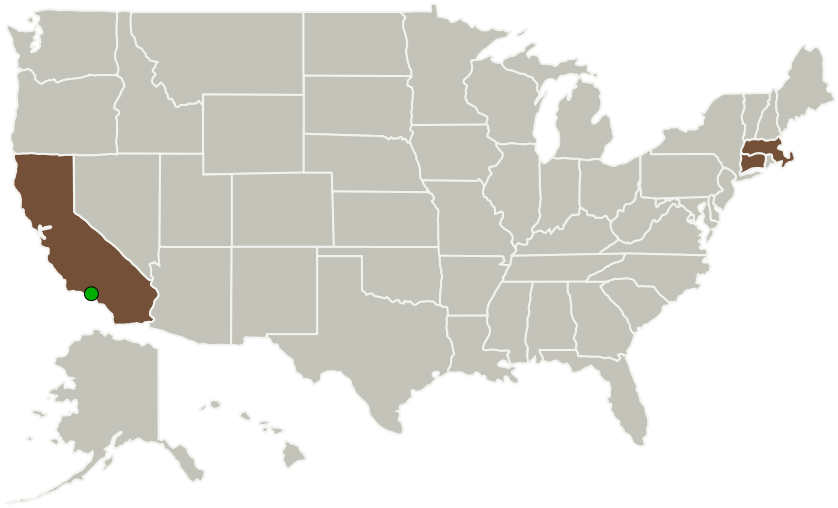
Uncooled near- and mid-IR spectrometer engine., Phase I

Completed Technology Project (2012 - 2013)

Project Introduction

Agiltron proposes to develop an extremely compact and high sensitivity uncooled near- and mid-infrared (NMIR) spectrometer engine for planetary compositional analysis and mapping. In this program, we will produce lead salt-based IR detector materials with single crystalline-like oriented thin film structures which will increase the majority charge carrier mobility by two orders of magnitude. Exceptionally high charge carrier mobility will significantly improve photosensitivity and greatly reduce noise of the IR detectors and detector arrays. We will produce this unique thin film structure by employing so called "nano-graphoepitaxy", in which lead salt thin films are deposited on nanoengineered substrates, then followed by sensitizing them in controlled process conditions. Micro-grooved substrates will further enhance photon absorption efficiency via the ray optics. Furthermore, we will design and develop an extremely compact and high spectral resolution spectrometer engine by employing an aperiodic nanostructure-based spectrometer platform. In Phase I, we will design, fabricate and test nanoengineered NMIR detector materials and arrays. We will also conceptually design the aperiodic nanostructure-based spectrometer for NMIR applications. In Phase II, we will produce and evaluate the performance of a prototype uncooled near- and mid-IR spectrometer engine by integrating the high sensitivity detector arrays into the aperiodic nanostructured spectrometer platform.

Primary U.S. Work Locations and Key Partners



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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
AGILTRON Corporation	Lead Organization	Industry	Woburn, Massachusetts
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
Yale University	Supporting Organization	Academia	New Haven, Connecticut

Primary U.S. Work Locations	
California	Connecticut
Massachusetts	

Project Transitions

February 2012: Project Start

February 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138556)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

AGILTRON Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

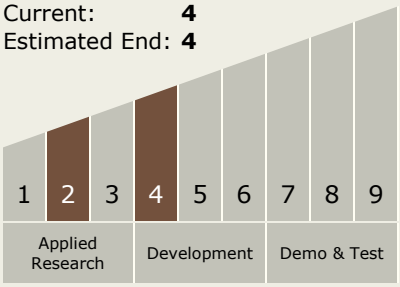
Carlos Torrez

Principal Investigator:

Jae Ryu

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System